Saskatchewan Agriculture and Food

# FARM *FACTS*

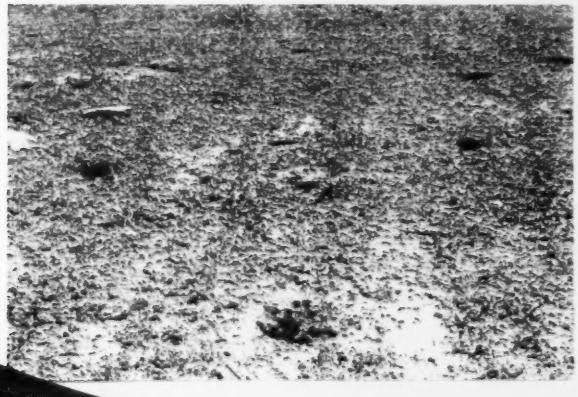
## Control of Richardson's Ground Squirrels

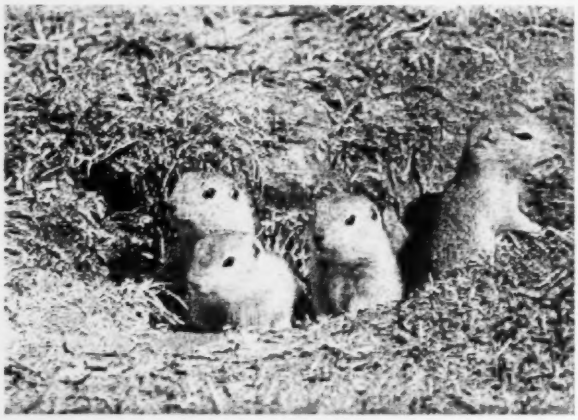
### Background

Ground squirrels have been the bane of early pioneers and homesteaders since the opening and settling of the West. Their range includes portions of Alberta, Saskatchewan, Manitoba, Montana, North and South Dakota, and Minnesota.

Richardson's ground squirrels are herbivores. They eat forage grasses, forage legumes, cereal crops, pulse crops, canola and native grasses. Agricultural input costs rise significantly where the rodent occurs in great numbers.

Each adult Richardson's ground squirrel maintains its own home range into which it will allow only its closest kin to intrude. They prefer open terrain with high visibility to detect approaching predators. They fare well in human-modified habitats such as city parks, over-grazed pastures, the edges of cultivated fields and perennial forage crop fields. A female's home range during the summer months averages around 240 square metres, and its borders will often overlap those of its neighbours. Each adult female owns at least one burrow system that has two or three exits and two to five sleeping chambers.





The range includes the main burrow system as well as favourite feeding sites. The range of an individual ground squirrel is not static, but changes throughout the year in response to various factors including the mating season, population density, presence of juveniles, the availability of feed and the onset of hibernation.

Richardson's ground squirrels can be seen above ground from mid-February to October. Adult males will emerge from the ground in February followed by the females in March. Both sexes are reproductively mature at one year old. Mating occurs only in the spring, shortly after the females emerge from hibernation in March. Each female can only produce one litter per year. The size of the litter is usually in the range of six to eight offspring. The juvenile squirrels first emerge above the ground when four weeks old. Generally, 10-20 per cent of juvenile males and 40-50 per cent of juvenile females survive to adulthood. Maximum life span for the males is three years, and six years for the females.

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## Control Measures

Historically, control measures have included leg hold traps, firearms, and a variety of poison baits such as arsenic, scilloricide, thallium and strychnine.

Today, rodenticides are seen as an effective method of managing ground squirrel damage. More specifically, grain-based poison baits have been the tool-of-choice for decades as the products are relatively cheap, readily accessible and easy to use.

## Strychnine

Liquid strychnine concentrate (LSC) availability, sale and use is now very limited and it will not be provided after June 30, 2003. Saskatchewan Agriculture, Food and Rural Revitalization was granted a final emergency registration of two per cent liquid strychnine concentrate from the Pest Management Regulatory Agency of Health Canada effective February 3, 2003 and ending June 30, 2003. This concentrate will be distributed only through Rural Municipality offices. This amount of strychnine provided will not meet the anticipated demand.

Farmers in rural municipalities that may have access to the two per cent strychnine concentrate must supply their own grain (cleaned oats and wheat) for mixing down to the 0.4 per cent active ingredient level by a pest control officer. Farmers are encouraged to look for alternatives measures, since future ground squirrel control programs will not have the LSC as a tool.

**Alternatives to LSC include:**

| | | |
|---|---|---|
| Zinc Phosphide | Clean Crop Burrow Oat Bait<br>Zp Rodent Bait | 2.0%<br>2.0% |
| Cholecalciferol<br>Vitamin D3 | Quintox Field Formula | 0.15% |
| Sulfur | The Giant Destroyer | 10.8% in 82.4 L of gas produced |
| Chlorophacinone | Rozol 0.1% Dry Concentrate | 0.1% |
| | Rozol Mineral Oil Concentrate | 0.28% |
| | Wilson Rozol Paraffinized Pellets | 0.07% |
| | Ground Force Paraffinized Pellets | 0.005% |
| | Wilson Liquid Rozol Rodenticide | 0.07% |
| | Ratol Paraffinized Pellets | 0.005% |
| DIPHACINONE | Ramik Green Rodenticide | 0.005% |

**Ready to use strychnine baits over and above fresh-from-concentrate baits include:**

| Strychnine RTU baits currently available | Active |
|---|---|
| K-9 Pocket Gopher Bait | 0.4% |
| Wilson Strychnine Gopher-Kill Bait | 0.4% |
| Fairview Gopher Cop R.T.U. | 0.35% min |
| S.A.R.M. Gopher Poison R.T.U. | 0.35% min |
| Elston Gopher Getter Bait I | 0.4 % |
| Elston Gopher Getter Bait II | 0.4 % |
| Wilco Gopher Ground Squirrel Bait | 0.4 % |

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## Anticoagulants

Anticoagulants are separated into two functional groups, first-generation and second-generation. First-generation anticoagulants are used for the control of certain field rodents, including ground squirrels, pocket gophers, and voles. First-generation anticoagulants will require additional management to be effective.

Second-generation anticoagulants have the ability to control warfarin-resistant rats and house mice, and they are also considered single-use feeding anticoagulants.

First generation anticoagulants, used for the control of Richardson's ground squirrels (diphacinone, and chlorophacinone), are multiple-dose rodenticides, and they rely on their cumulative toxic effect. They are substantially more toxic if consumed in small doses over a period of several days than if consumed in one large amount. The baits are formulated so that rodents have to feed a minimum of three to five days before a lethal dose is achieved and then death follows a few days later. To achieve this multiple feeding, the bait must be made available on a continuous basis until the desired control is reached.

Bait trays or bait boxes have to be designed to hold substantial amounts of bait, and must be strategically located so that all rodents in an area have access to ample bait for repeated feedings until death.

The delay of death has a safety advantage because it provides time to administer an antidote and save pets, livestock, and people who may have accidentally ingested the bait. Vitamin K1 is the antidote for anticoagulants and, if administered soon enough after intake, can reverse the action of the anticoagulant.

As well, the slow action of the anticoagulant baits has another advantage in that the target animal is unable to associate its illness with the bait eaten. Therefore, bait shyness or toxicant shyness does not occur.

Most of the anticoagulant baits used today are commercial ready-to-use formulations. Very few individuals prepare their own baits from concentrates as they commonly did 20 years ago. Ready-to-use bait increases the cost of rodent control but avoids past problems of incorrect bait concentrations and poor bait formulation, which often led to poor control.

## How anticoagulants work

All anticoagulants have two actions: they reduce the clotting ability of the blood and cause damage to the capillaries (tiny blood vessels). The rate of blood clotting gradually decreases and blood loss leads to an apparently painless death.

Repeated daily doses of the anticoagulants greatly increase their effective toxicity. Feeding does not have to be on consecutive days, but several feedings should occur within a 10-day interval with no longer than 48 hours between feedings. Plenty of bait must be made available at all times to achieve adequate control.

## Precautions

Precautions should be taken to prevent children, pets and livestock from gaining access directly to anticoagulant bait. The bait should be placed in areas inaccessible to nontarget animals or in tamper-resistant bait stations. A single substantial ingestion of diphacinone or chlorophacinone will, for example, place a dog in jeopardy, requiring veterinary attention. When used according to label instructions, there is little potential hazard to nontarget species.

A secondary hazard associated with predator or scavenger animals consuming rodent carcasses is a concern when anticoagulants are used for field rodent control.

## Contact Us:

For more information contact your Rural Service Centre.

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